

### REMARKS / ARGUMENTS

Claims 1, 5-9, 13-17, and 21-24 have been rejected under 35 USC 103(a) as being unpatentable over Burns, US Pat. 5,828,769 ("Burns"), in view of Eibert et al. US Patent 5,621,807 ("Eibert").

Claim 1 has been amended to make more clear that the object model is a **geometric** object model, and that the part models are **geometric** part models. By contrast, Burns teaches image patches and encoded image patches (col. 4, lines 1-26. Burns is silent on including any geometric data, or any other aspect of a geometric model. In fact, Burns repeatedly teaches away from using geometric models, specifically stating that "indistinct features as, for example, line junctions, elliptical arcs or edge points" are to be avoided so as to arrive at an improved image recognition mechanism (col. 3, lines 24-30). There are many other references to the problems of using "line junctions, elliptical arcs or edge points", such as at col. 2, lines 1-8; col. 2, lines 17-19; and col. 2, lines 33-37. By contrast, on page 1 of the Specification, lines 24-26, it clearly states that "a geometric model of an object may comprise a set of geometric elements, each element comprising an arc or a line defining a substantial part of the object's geometry".

Further, since Eibert teaches geometric models, Burns is clearly teaching away from any combination with Eibert. Moreover, Eibert teaches three-dimensional geometric models in an image ranging context, which is very

different from two-dimensional "image patch" models in Burns. This great difference suggests that such a combination would not be useful or functional, thereby further teaching away from combining Burns and Eibert.

Moreover, there is no suggestion to combine present in either reference. In particular, Burns is silent on refining the model. For example, looking at all the figures of Burns, there is not a single feed-back loop evident in the data flow diagram of Fig. 2. Thus, Burns does not contemplate improving a model. Instead, Burns uses "voting" among a plurality of local pose estimates, as shown in Fig. 2, to overcome problems with each individual model image patch.

Further, even if these references were combined, they would not provide the invention of claim 1, as herein amended, since amended claim 1 now requires **two-dimensional geometric** models, and **two-dimensional geometric** part models. Neither Burns or Eibert disclose two-dimensional geometric models, or two-dimensional geometric part models, and no possible combination of Burns and Eibert could provide these aspects that are now more clearly required by amended claim 1.

Yet further, Eibert does not teach part models, sub-models, or anything other than a complete whole geometric model. By contrast, Applicant teaches and claims geometric part models, i.e., geometric sub-models, that together form a geometric model. Burns does not repair this deficiency, since Burns does not teach geometric models, so Burns cannot teach geometric part models.

Consequently, the rejection of claim 1 under 35 USC 103(a) is deemed to be overcome.

Regarding claim 5, neither Eibert or Burns teach "determining the dimension of said part of said object", Eibert clearly because Eibert does not address parts, and measures only position and attitude of a large model. Burns also is silent on determining the dimensions of the image patches. Further, the Examiner is silent on any reference to substantiate the rejection. Moreover, claim 5 depends from amended claim 1, herein deemed to be allowable. Consequently, claim 5 is also deemed to be allowable.

Regarding claims 6 and 7, since Eibert relates to a three-dimensional system with three-dimensional vectors, and claims 6 and 7 now require two-dimensionality, claims 6 and 7 now do not read on Eibert. Further, claims 6 and 7 now depend from amended claim 1, herein deemed to be allowable. Consequently, claims 6 and 7 are also deemed to be allowable.

Regarding claim 8, the Examiner cites Burns at col. 3, lines 18-23 as teaching that it would be useful to use an iterative match refinement technique for improving a model after recognizing it. However, Burns actually teaches away from using an iterative technique, in fact stating at col. 3, lines 18-23: "Although Wu and Bhanu consider the use of a larger number of locally encoded patches, they suggest an iterative match refinement technique which, although potentially useful for verifying and improving a pose estimate after an object has been roughly detected and located, **is NOT particularly effective in recognizing an object** in the first place."

Further, Applicant refines a geometric model by refining its geometric part models, as clearly required by the first element of claim 8. By contrast, Eibert merely refines the whole model, because there are no constituent part models.

Moreover, claim 8 depends from amended claim 1, herein deemed to be allowable. Consequently, claim 8 is also deemed to be allowable.

Claims 9, 13, 14, 15, 16, 17, 21, 22, 23, and 24 were all rejected for analogous reasons, and analogous arguments are hereby advanced to show that these claims too are allowable. Accordingly, the rejection of claims 9, 13, 14, 15, 16, 17, 21, 22, 23, and 24 under 35 USC 103(a) is deemed to be overcome.

Claims 2-4, 10-12, and 18-20 have been rejected under 35 USC 103(a) as being unpatentable over Burns, in view of Eibert, and further in view of Shum et al. US Patent 6,084,592 ("Shum").

Shum teaches three-dimensional models, and the amended claims now require two-dimensionality. Further, claim 2 depends from claim 1, deemed herein to be allowable. Accordingly, claim 2 is also deemed to be allowable, and the rejection of claim 2 under 35 USC 103(a) is deemed to be overcome.

Regarding claims 3 and 4, these claims are also deemed to be allowable for the same reasons as advanced regarding claim 2.

Appl. No. 09/809,027  
Amdt. dated 07/10/2004  
Reply to Office action of March 10, 2004

Regarding claims 10-12, and 18-20, these claims are analogous to claims 2-4, and are deemed allowable for the same reasons. Consequently, the rejection of claims 10-12, and 18-20 is deemed to be overcome.

Accordingly, Applicants assert that the present application is in condition for allowance, and such action is respectfully requested. The Examiner is invited to phone the undersigned attorney to further the prosecution of the present application.

Respectfully Submitted,

Dated: 7/10/04



Russ Weinzimmer  
Registration No. 36,717  
Attorney for Applicants

P.O. Box 862  
Wilton, NH 03086

Tel: 603-654-5670  
Fax: 603-654-3556